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ISO9001 Certified

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E

mod. IO-CB/AI-08HL-00

M.U. IO-CB/AI-08HL-2/07.07
Cod. J30-478-1AAI-08HL E

User manual

Contents

- Characteristics
- Functional Block Diagram
- PDOs used by the module
- Hardware Set-up
- Parameter configuration
- Commands
- Emergency messages
- Parameter Store/Restore
- Object Dictionary

CANopen I/O Module 8 Configurable Analogue Inputs mod. IO-CB/AI-08HL

SERIES

8 inputs configurable for:
- mA, V linear inputs

Applicable standards

The AI-08HL module is suited for the CiA DS301 protocol [1] and implements the CiA DS 401 standard Device Profile, as far as the Analogue Input Function Block is concerned [2].

Warning

1) **The product described in this manual should only be installed, operated and maintained by qualified application programmers and software engineers who are familiar with automation safety concepts and applicable national standards.**
2) **This product supports the Parameter defaults indicated by CiA standards, in addition, some parameters have a factory set (value present in the module when comes from the factory). The default values can be loaded with the restore command, but after the restore, factory set values are lost.**

Characteristics

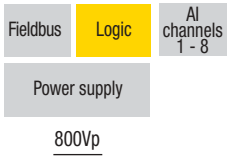
Technical data

Accuracy at 25°C	±0.1% FS
Temperature coefficient	0.01% FS/K
Input impedance	mA < 300Ω V > 10kΩ
Digital resolution	16 bit
Conversion time	5 ms
Overvoltage protection	30 V
CMRR	> 100 dB

General

3 way isolation	800 Vp
Power supply	24 Vdc; –15...+25%
Power consuption	3 W
Dimensions	L: 76; H: 110; W: 65
Weight	220 g
Safety regulations EN61010-1	**Isolation class II** (50 Vrms) Installation cathegory II Pollution degree 2
CE marking	EN61131-2

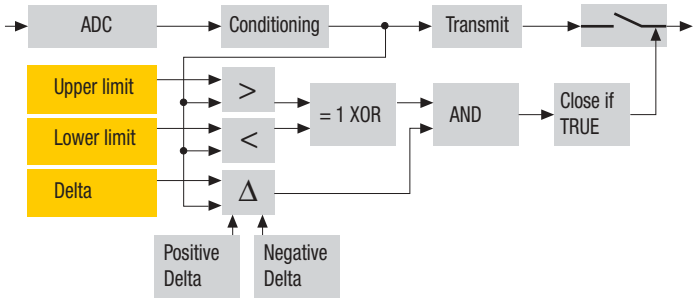
3 way isolation diagram



Environment

	Operating	Storage
Temperature	-10...+65°C	-40...+85°C
Relative Humidity	5...95% non condensing Appropriate measures must be taken against humidity >85%	5...95% non condensing For a short period, slight condensation may appear on the housing
Mounting	Vertical, free air	
Protection	IP20	
Vibrations (3 axes)	10...57Hz 0.0375mm 57...150Hz 0.5g	
Shock (3 axes)	15g, 11ms half sine	

Functional Block Diagram



The analogue input function block describes, for each input channel, how field values are transmitted.

Every time one of the limit conditions is reached an asynchronous transmission takes place.

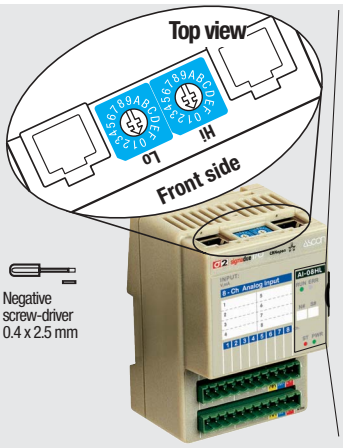
PDOs used by the module

TPDO	Properties	Mapped objects	Index	Sub-index
TPDO 2	COBID: 280h + NodeID Transmission Type: 01h *	Read Analog Input ch 1	6401h	01h
		Read Analog Input ch 2	6401h	02h
		Read Analog Input ch 3	6401h	03h
		Read Analog Input ch 4	6401h	04h
TPDO 3	COBID: 380h + NodeID Transmission Type: 01h *	Read Analog Input ch 5	6401h	05h
		Read Analog Input ch 6	6401h	06h
		Read Analog Input ch 7	6401h	07h
		Read Analog Input ch 8	6401h	08h

Note: * The Transmission Type is configurable; **01h** is the factory set (value present in the modules when come from the factory), the default value is **FFh**.

Hardware Set-up

Hexadecimal rotary switches, service and I/O LEDs



LED	Status	Meaning
RUN	ON	Operational
	Blinking	Pre-operational (CANopen)
	Single flash	STOPPED
	OFF	Device in RESET state
ERR	ON	BUS OFF
	Single flash	Warning limit reached
	Double flash	Error Control Event
	Triple flash	Sync Error (CANopen)
	OFF	No error. Device working
ST	ON	DIAG Error
	Blinking	INIT and DIAG running
	Single flash	Baud rate setting
	OFF	Module OK and ready
PWR	ON	Module Power Supply ON
	OFF	Module Power Supply OFF

Bit Rate and Node ID configuration

Bit rate

Lo switch	Baud rate kbps	Bus length m
1	20	2500
2	50	1000
3	100	500
4	125	500
5	250	250
6 *	500	100
7	800	50
8	1000	25

Node ID

Hi switch	Lo switch	Valid ID Node
0	1	01h (address 1)
0	2	02h (address 2)
↓	↓	↓
7	F	7Fh (address 127D) *

Notes: * Default value

Procedure for Node ID and Bit Rate configuration

The HI and LO hexadecimal rotary swithches set the module's Bit Rate and CAN Node ID. During the configuration, the module must be **off line** and the CAN bus must be physically disconnected.

To configure the module, follow the procedure:

1 Turn the Power OFF
2 Set the **HI** switch to "F"
3 Select the desired Bit Rate value by setting the **LO** switch following the table (e.g. "8" for 1 Mbps)
4 Turn the Power ON
5 Shift the **HI** switch to "E" (all the module service LEDs should flash)
6 Turn the Power OFF. Now configure Node ID
7 Set the **HI** and **LO** switches to the desired valid Node ID following the table
8 Turn the Power ON.

Alternatively, at step 7 set the value 00h. Then, at the next Power ON, the last valid stored value will be resumed as Node ID.

Default values: Bit Rate = 500 kbps, Node ID = 127D

Parameter configuration

Module specific parameters

Index 2000h – Terminal Block Temperature
Ambient temperature, measured on the module's terminal block.
Not available through TPDO.

Index 3000h – Node Address
Current Module Node ID - Read only access

Index 3001h – Baudrate
Current Module Bit rate - Read only access

Parameters setting

Index 2001h – Analogue Input Type
The n-th subindex (from 1 to 8) contains the configuration parameter of the n-th Analogue Input

Value	Input type	Condition
0x00	0...10 V	Default
0x01	0...20 mA	
0x02	4... 20 mA	

Standard parameters

Index 6421h - Analog Input Interrupt Trigger Selection
This object determines, which events shall cause an interrupt for a specific channel. Bits set in the list below shall refer to ways in which interrupts may be triggered.

Bit number	Interrupt trigger
0	Upper limit exceeded
1	Input below lower limit
2	Input changed by more than delta
3	Input reduced by more than negative delta
4	Input increased by more than positive delta
5 to 7	reserved for future use

Index 6422h - Analog Input Interrupt Source
This object shall determine which channel has produced an interrupt. Bits set shall relate to the number of any channels that have produced interrupts. The bits shall be reset automatically after read by SDO or transmitted by means of a PDO.
1 = interrupt produced
0 = no interrupt produced.

Index 6423h - Analog Input Global Interrupt Enable
This object shall enable and disable globally the interrupt behaviour without changing the interrupt mask. By default, no analogue input activates an interrupt.
TRUE = global interrupt enabled
FALSE = global interrupt disabled

Index 6424h - Analog Input Interrupt Upper Limit Integer
If enabled (see 6423h object), an interrupt is triggered when the analogue input is equal or rises above the given value. The value shall be always left adjusted. As long as the trigger condition is met, every change of the analogue input data generates a new interrupt, if there is no additional trigger condition, e.g. an input interrupt delta (6426h).

Index 6425h - Analog Input Interrupt Lower Limit Integer
If enabled (see 6423h object), an interrupt is triggered when the analogue input is equal or rises above the given value. The value shall be always left adjusted. As long as the trigger condition is met, every change of the analogue input data generates a new interrupt, if there is no additional trigger condition, e.g. an input interrupt delta (6426h).

Index 6426h - AI Interrupt Delta Unsigned
This object shall set the delta value (rising or falling above or below the last communicated value) for interrupt-enabled analogue inputs (see 6423h object).

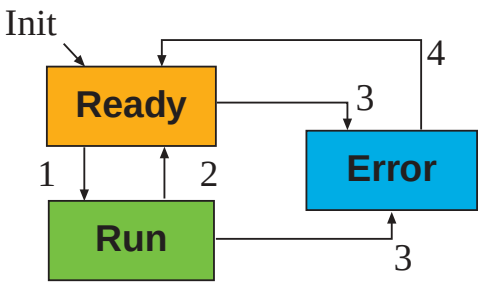
Index 6427h - AI Interrupt Negative Delta Unsigned
This object shall set the negative delta value (falling below the last communicated value) for interrupt-enabled analogue inputs (see 6423h object).

Index 6428h - AI Interrupt Positive Delta Unsigned
This object shall set the positive delta value (rising above the last communicated value) for interrupt-enabled analogue inputs (see 6423h object).

Commands

Index 200Ch – Operating mode

The device has its own internal state machine. It is possible to move through this by sending appropriate values to the Index 200Ch, following the table below.



Transition	Operating mode value	Behaviour
Init	-	At Power-Up, the Device is in the "ready" state. Transition 1 is also executed if Index 200Ch - Operating Mode contains the default value 1
1	01h (default)	Operating mode "RUN" is activated
2	00h	Return to the initialisation "ready" state. The transition is performed: • following an operator's command • **after assigning the configuration parameter (2001h)**
3	FFh	The "error" state is automatically assigned by the device (and the operating mode value is read only) when: • an attempt is made to execute an unexpected command
4	00h	This value causes an exit from the "error" state, after the error condition is acknowledged. The only transition is to the "ready" state

Emergency messages

The module automatically sends emergency messages including error codes. The communication errors are described in CiA DS301 [1].
The error codes are expressed as a DEVICE SPECIFIC ERROR type of code, one for each channel: 0xFF0n for channel n. The codes indicating a specific condition are also inserted, following the table below:

Error code	Error
0000000000	**No error** –This code is generated when exiting an error contidion, to notify the end of one of the error states
0000000001	**Error No Valid Calib** – An attempt to change the state of an input channel not properly calibrated to "operating"
0000000002	**Error No Config** – An attempt to change the state of an input channel with a non valid Sensor Type to "operating"
0000000006	**Error No Command** – Invalid command received
0000000007	**Error Wrong Command** – An attempt to execute a command from an illegal state
0000000008	**Error Wrong Assignment** – An attempt to assign a parameter from an illegal state

	0	1	2	3	4	5	6	7
Emergency message	0nh	FFh	21h	00h	00h	00h	00h	0yh
	COB – ID = [entry 1014h] + NodeID							
				Error code				

Parameter Store/Restore

This module allows parameters to be saved in a non volatile memory. In order to avoid storing parameters by mistake, storage is only executed when a specific signature is written to the appropriate subindex. The signature is "save".

Similarly, the default values of parameters, according to the communication or device profile, are restored. On receipt of the correct signature in the appropriate subindex, the device restores the default parameters and then confirms the SDO transmission. The signature is "load".

The new configuration becomes active after a reset, i.e. after a "Power Down" or an NMT "Reset Node" message.

Byte	0	1	2	3	4	5	6	7
Store Parameter	22h	10h	10h	01h	73h	61h	76h	65h
					s	a	v	e
	COB – ID = 600h + NodeID							
Restore Parameter	22h	11h	10h	01h	6Ch	6Fh	61h	64h
					l	o	a	d
	COB – ID = 600h + NodeID							

SDO Messages

The entries of a device Object Dictionary are accessed trough SDO (Service Data Object) messages. The basic SDO messages are as follows, as based on the Client – Server request and response model:

Byte	0	1	2	3	4	5	6	7
Read request	40h	Index		Sub-Index	Reserved			
	COB – ID = 600h + NodeID							
Read response	4xh *	Index		Sub-Index	Data			
	COB – ID = 580h + NodeID							
Write request	22h	Index		Sub-Index	Data			
	COB – ID = 600h + NodeID							
Write response	60h	Index		Sub-Index	Reserved			
	COB – ID = 580h + NodeID							

* This code is type dependant.
Please refer to the CIA DS301 Profile for more details.

Reference documents

List of CiA documents to which the user should refer:
[1] CiA DS301 - CANopen Application Layer and Communication Profile
[2] CiA DS401 - CANopen Device Profile: Generic I/O Modules

Accessories, Spare Parts and Warranty

Power Supply 45W 24Vdc 2A	AP-S2/AL-DR45-24
Power Supply 120W 24Vdc 5A	AP-S2/AL-DR120-24
Additional Terminal Block 2x11	AP-S2/TB-211-1
Female Plug 11 Screw clamp	AP-S2/SPINA-V11
Female Plug 11 Spring clamp	AP-S2/SPINA-M11
RJ45 terminated cable 14cm	AP-S2/LOCAL-BUS76
RJ45 terminated cable 22cm	AP-S2/LOCAL-BUS152
CAN termination Adapter	AP-S2/TERM-CAN

Warranty: 3 years excluding defects due to improper use

Object Dictionary (with default values)

⚠ In order to configure the module, it is necessary to connect it to a PC with the CAN interface and the superivisory software installed. The configuration can be obtained by writing the desired values to the module's variables listed in the Object Dictionary.

Object Dictionary structure

Index (hex)	Sub Index	Object	Name	Default [hex]	Type	Acc. Attr.	MO
1000		VAR	Device Type	00040191	UNSIGNED32	RO	M
1001		VAR	Error Register	00	UNSIGNED8	RO	M
1003		ARRAY	Predefined error field	00000000	UNSIGNED32	RO	O
1005		VAR	COB-ID SYNC	00000080	UNSIGNED32	RW	O
1006		VAR	Communication cycle period	00000000	UNSIGNED32	RW	O
1007		VAR	Synchrounous window length	00000000	UNSIGNED32	RW	O
1008		VAR	Manufacturer Device Name	"08HL"	Vis-String	const	O
1009		VAR	Manufacturer Hardware Version	"1.00"	Vis-String	const	O
100A		VAR	Manufacturer Software Version	"1.00"	Vis-String	const	O
100C		VAR	Guard Time	0000	UNSIGNED16	RW	O
100D		VAR	Life Time Factor	00	UNSIGNED8	RW	O
1010		ARRAY	Store Parameters		UNSIGNED32		O
	00h	VAR	Largest subindex supported	01	UNSIGNED8	RO	
	01h	VAR	Save all parameters	03	UNSIGNED32	RW	
1011		ARRAY	Restore Default Parameters		UNSIGNED32	RW	O
	00h	VAR	Largest subindex supported	01	UNSIGNED8	RO	
	01h	VAR	Restore all default parameters	01	UNSIGNED32	RW	
1014		VAR	COB-ID EMCY	80 + NodeID	UNSIGNED32	RW	O
1015		VAR	Inhibit Time EMCY	0000	UNSIGNED16	RW	O
1017		VAR	Producer heartbeat time	07D0	UNSIGNED16	RW	O
1018		RECORD	Identity Object	Identity (23h)			M
	00h	VAR	Number of entries	01	UNSIGNED8	RO	
	01h	VAR	Vendor ID	000000E9	UNSIGNED32	RO	
1200		RECORD	Server SDO parameter		SDO Parameter (22h)		O
	00h	VAR	Number of entries	02	UNSIGNED8	RO	
	01h	VAR	COB-ID Client → Server (rx)	600+NodeID	UNSIGNED32	RO	
	02h	VAR	COB-ID Server → Client (tx)	580+NodeID	UNSIGNED32	RO	
1800		RECORD	1st Transmit PDO Comm Param.		PDO CommPar (20h)		M
	00H	VAR	Largest subindex supported	05	UNSIGNED8	RO	
	01h	VAR	COB-ID used	180+NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF *	UNSIGNED8	RW	
	03h	VAR	Inhibit time	0000	UNSIGNED16	RW	
	04h	VAR	Reseved		UNSIGNED8	RW	
	05h	VAR	Event timer	0000	UNSIGNED16	RW	
1801		RECORD	2nd Transmit PDO Comm Param.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	05	UNSIGNED8	RO	
	01h	VAR	COB-ID used	280+NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF *	UNSIGNED8	RW	
	03h	VAR	Inhibit time	0000	UNSIGNED16	RW	
	04h	VAR	Reseved		UNSIGNED8	RW	
	05h	VAR	Event timer	0000	UNSIGNED16	RW	
1802		RECORD	3th Transmit PDO Comm Param.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	05	UNSIGNED8	RO	
	01h	VAR	COB-ID used	380+NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF *	UNSIGNED8	RW	
	03h	VAR	Inhibit time	0000	UNSIGNED16	RW	
	04h	VAR	Reseved		UNSIGNED8	RW	
	05h	VAR	Event timer	0000	UNSIGNED16	RW	
1803		RECORD	4th Transmit PDO Comm Param.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	05	UNSIGNED8	RO	
	01h	VAR	COB-ID used	480+NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF *	UNSIGNED8	RW	
	03h	VAR	Inhibit time	0000	UNSIGNED16	RW	
	04h	VAR	Reseved		UNSIGNED8	RW	
	05h	VAR	Event timer	0000	UNSIGNED16	RW	
1A00		RECORD	1st Transmit PDO Mapping	UNUSED	PDO Mapping (21h)		M
	00h	VAR	No. of mapped application obj.	00	UNSIGNED8	RO	
1A01		RECORD	2nd Transmit PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	No. of mapped application obj.	04	UNSIGNED8	RO	
	01h	VAR	Read Analogue Input 16 bit - ch1	64010110	UNSIGNED32	RO	
	02h	VAR	Read Analogue Input 16 bit - ch2	64010210	UNSIGNED32	RO	
	03h	VAR	Read Analogue Input 16 bit - ch3	64010310	UNSIGNED32	RO	
	04h	VAR	Read Analogue Input 16 bit - ch4	64010410	UNSIGNED32	RO	
1A02		RECORD	3th Transmit PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	No. of mapped application obj.	04	UNSIGNED8	RO	
	01h	VAR	Read Analogue Input 16 bit - ch5	64010510	UNSIGNED32	RO	
	02h	VAR	Read Analogue Input 16 bit - ch6	64010610	UNSIGNED32	RO	
	03h	VAR	Read Analogue Input 16 bit - ch7	64010710	UNSIGNED32	RO	
	04h	VAR	Read Analogue Input 16 bit - ch8	64010810	UNSIGNED32	RO	
1A03		RECORD	4th Transmit PDO Mapping	UNUSED	PDO Mapping (21h)		M
	00h	VAR	No. of mapped application obj.	00	UNSIGNED8	RO	
2000		ARRAY	Cold Junction Temperature				O
	00h	VAR	Number of entries	01	UNSIGNED8	RO	
	01h	VAR	Cold Junction Measure		INTEGER16	RO	
2001		ARRAY	AI Input Type				O
	00h	VAR	Number of entries	08	UNSIGNED8	RO	
	01h	VAR	AI Input Typech1	00	UNSIGNED8	RW	
	02h	VAR	AI Input Type ch2	00	UNSIGNED8	RW	
	03h	VAR	AI Input Type ch3	00	UNSIGNED8	RW	
	04h	VAR	AI Input Type ch4	00	UNSIGNED8	RW	
	05h	VAR	AI Input Type ch5	00	UNSIGNED8	RW	
	06h	VAR	AI Input Type ch6	00	UNSIGNED8	RW	
	07h	VAR	AI Input Type ch7	00	UNSIGNED8	RW	
	08h	VAR	AI Input Type ch8	00	UNSIGNED8	RW	

Index (hex)	Sub Index	Object	Name	Default [hex]	Type	Acc. Attr.	MO
200C		ARRAY	AI Operating Mode				O
	01h	VAR	Number of entries	08	UNSIGNED8	RO	
	01h	VAR	AI Operating Mode ch1	01	UNSIGNED8	RW	
	02h	VAR	AI Operating Mode ch2	01	UNSIGNED8	RW	
	03h	VAR	AI Operating Mode ch3	01	UNSIGNED8	RW	
	04h	VAR	AI Operating Mode ch4	01	UNSIGNED8	RW	
	05h	VAR	AI Operating Mode ch5	01	UNSIGNED8	RW	
	06h	VAR	AI Operating Mode ch6	01	UNSIGNED8	RW	
	07h	VAR	AI Operating Mode ch7	01	UNSIGNED8	RW	
	08h	VAR	AI Operating Mode ch8	01	UNSIGNED8	RW	
3000		VAR	Node Address	7F	UNSIGNED8	RO	O
3001		VAR	Node Baurate	06	UNSIGNED8	RO	O
6401		ARRAY	Read Analogue Input 16 - bit				M
	00h	VAR	Number of entries	08	UNSIGNED8	RO	
	01h	VAR	Read Analogue Input 16bit - ch1		INTEGER16	RO	
	02h	VAR	Read Analogue Input 16bit - ch2		INTEGER16	RO	
	03h	VAR	Read Analogue Input 16bit - ch3		INTEGER16	RO	
	04h	VAR	Read Analogue Input 16bit - ch4		INTEGER16	RO	
	05h	VAR	Read Analogue Input 16bit - ch5		INTEGER16	RO	
	06h	VAR	Read Analogue Input 16bit - ch6		INTEGER16	RO	
	07h	VAR	Read Analogue Input 16bit - ch7		INTEGER16	RO	
	08h	VAR	Read Analogue Input 16bit - ch8		INTEGER16	RO	
6421		ARRAY	AI Interrupt Trigger Selection				O
	00h	VAR	Number of entries	08	UNSIGNED8	RO	
	01h	VAR	AI Interrupt Trigger Selection - ch1	07	UNSIGNED8	RW	
	02h	VAR	AI Interrupt Trigger Selection - ch2	07	UNSIGNED8	RW	
	03h	VAR	AI Interrupt Trigger Selection - ch3	07	UNSIGNED8	RW	
	04h	VAR	AI Interrupt Trigger Selection - ch4	07	UNSIGNED8	RW	
	05h	VAR	AI Interrupt Trigger Selection - ch5	07	UNSIGNED8	RW	
	06h	VAR	AI Interrupt Trigger Selection - ch6	07	UNSIGNED8	RW	
	07h	VAR	AI Interrupt Trigger Selection - ch7	07	UNSIGNED8	RW	
	08h	VAR	AI Interrupt Trigger Selection - ch8	07	UNSIGNED8	RW	
6422		ARRAY	AI Interrupt Source				O
	00h	VAR	Number of entries	01	UNSIGNED8	RO	
	01h	VAR	AI Interrupt Source	00	UNSIGNED8	RO	
6423		VAR	AI Global Interrupt Enable	FALSE	BOOLEAN	RW	O
6424		ARRAY	AI Interrupt Upper Limit Integer				O
	00h	VAR	Number of entries	08	UNSIGNED8	RO	
	01h	VAR	AI Interrupt Upper Limit Integer - ch1	00	INTEGER32	RW	
	02h	VAR	AI Interrupt Upper Limit Integer - ch2	00	INTEGER32	RW	
	03h	VAR	AI Interrupt Upper Limit Integer - ch3	00	INTEGER32	RW	
	04h	VAR	AI Interrupt Upper Limit Integer - ch4	00	INTEGER32	RW	
	05h	VAR	AI Interrupt Upper Limit Integer - ch5	00	INTEGER32	RW	
	06h	VAR	AI Interrupt Upper Limit Integer - ch6	00	INTEGER32	RW	
	07h	VAR	AI Interrupt Upper Limit Integer - ch7	00	INTEGER32	RW	
	08h	VAR	AI Interrupt Upper Limit Integer - ch8	00	INTEGER32	RW	
6425		ARRAY	AI Interrupt Lower Limit Integer				O
	00h	VAR	Number of entries	08	UNSIGNED8	RO	
	01h	VAR	AI Interrupt Lower Limit Integer - ch1	00	INTEGER32	RW	
	02h	VAR	AI Interrupt Lower Limit Integer - ch2	00	INTEGER32	RW	
	03h	VAR	AI Interrupt Lower Limit Integer - ch3	00	INTEGER32	RW	
	04h	VAR	AI Interrupt Lower Limit Integer - ch4	00	INTEGER32	RW	
	05h	VAR	AI Interrupt Lower Limit Integer - ch5	00	INTEGER32	RW	
	06h	VAR	AI Interrupt Lower Limit Integer - ch6	00	INTEGER32	RW	
	07h	VAR	AI Interrupt Lower Limit Integer - ch7	00	INTEGER32	RW	
	08h	VAR	AI Interrupt Lower Limit Integer - ch8	00	INTEGER32	RW	
6426		ARRAY	AI Interrupt Delta Unsigned				O
	00h	VAR	Number of entries	08	UNSIGNED8	RO	
	01h	VAR	AI Interrupt Delta Unsigned - ch1	00	UNSIGNED32	RW	
	02h	VAR	AI Interrupt Delta Unsigned - ch2	00	UNSIGNED32	RW	
	03h	VAR	AI Interrupt Delta Unsigned - ch3	00	UNSIGNED32	RW	
	04h	VAR	AI Interrupt Delta Unsigned - ch4	00	UNSIGNED32	RW	
	05h	VAR	AI Interrupt Delta Unsigned - ch5	00	UNSIGNED32	RW	
	06h	VAR	AI Interrupt Delta Unsigned - ch6	00	UNSIGNED32	RW	
	07h	VAR	AI Interrupt Delta Unsigned - ch7	00	UNSIGNED32	RW	
	08h	VAR	AI Interrupt Delta Unsigned - ch8	00	UNSIGNED32	RW	
6427		ARRAY	AI Interrupt Negative Delta Unsigned				O
	00h	VAR	Number of entries	08	UNSIGNED8	RO	
	01h	VAR	AI Interrupt Negative Delta Unsigned - ch1	00	UNSIGNED32	RW	
	02h	VAR	AI Interrupt Negative Delta Unsigned - ch2	00	UNSIGNED32	RW	
	03h	VAR	AI Interrupt Negative Delta Unsigned - ch3	00	UNSIGNED32	RW	
	04h	VAR	AI Interrupt Negative Delta Unsigned - ch4	00	UNSIGNED32	RW	
	05h	VAR	AI Interrupt Negative Delta Unsigned - ch5	00	UNSIGNED32	RW	
	06h	VAR	AI Interrupt Negative Delta Unsigned - ch6	00	UNSIGNED32	RW	
	07h	VAR	AI Interrupt Negative Delta Unsigned - ch7	00	UNSIGNED32	RW	
	08h	VAR	AI Interrupt Negative Delta Unsigned - ch8	00	UNSIGNED32	RW	
6428		ARRAY	AI Interrupt Positive Delta Unsigned				O
	00h	VAR	Number of entries	08	UNSIGNED8	RO	
	01h	VAR	AI Interrupt Positive Delta Unsigned - ch1	00	UNSIGNED32	RW	
	02h	VAR	AI Interrupt Positive Delta Unsigned - ch2	00	UNSIGNED32	RW	
	03h	VAR	AI Interrupt Positive Delta Unsigned - ch3	00	UNSIGNED32	RW	
	04h	VAR	AI Interrupt Positive Delta Unsigned - ch4	00	UNSIGNED32	RW	
	05h	VAR	AI Interrupt Positive Delta Unsigned - ch5	00	UNSIGNED32	RW	
	06h	VAR	AI Interrupt Positive Delta Unsigned - ch6	00	UNSIGNED32	RW	
	07h	VAR	AI Interrupt Positive Delta Unsigned - ch7	00	UNSIGNED32	RW	
	08h	VAR	AI Interrupt Positive Delta Unsigned - ch8	00	UNSIGNED32	RW	

* The factory set (value present in the modules when new) for the transmission type is: **01h**.